

PART ONE GENERAL INFORMATION

CHAPTER 1 GENERAL RIGGING INFORMATION FOR CONTAINER LOADS

Section I RIGGING INFORMATION

1-1. Description of Container Loads

Container loads are loads that are rigged for airdrop in airdrop containers such as the A-7A airdrop cargo sling assembly, the A-21 cargo bag assembly, the A-22 cargo bag assembly, and the A-23 cargo bag assembly. These containers are packed with supplies, disassembled equipment, or small items of ready-to-use equipment prepared for airdrop. Loads may be required to be cushioned with honeycomb, felt, or cellulose wadding depending on the load requirements and the method of airdrop. The number and types of parachutes required to stabilize the load and slow its descent depend on the type of container used, the weight of the load, and the type of airdrop.

a. A-7A Airdrop Cargo Sling Assembly. The A-7A airdrop cargo sling assembly consists of four identical sling straps. The length of each strap is 188 inches. Each sling strap is fitted with a parachute harness adapter (commonly called a friction adapter) and a floating D-ring. Loads weighing up to 500 pounds may be airdropped with an A-7A airdrop cargo sling assembly. Each A-7A cargo sling strap weighs 1 1/2 pounds. Part Two of this manual covers rigging the A-7A container for airdrop.

b. A-21 Cargo Bag Assembly. The A-21 cargo bag assembly is an adjustable container. It consists of a sling assembly with scuff pad, fixed quick-release strap and assembly, two O-ring straps, three quick-release straps, and a 97- by 115-inch canvas cover. The A-21 cargo bag assembly has a 500-pound load capacity. Part Three of this manual covers rigging an A-21 container for airdrop.

c. A-22 Cargo Bag Assembly. The A-22 cargo bag

assembly is an adjustable cotton duck cloth/nylon and nylon webbing container. It consists of a sling assembly, a cover, and four suspension webs. The container weight is about 41 pounds. The load may be rigged with or without a cover. The weight capacity for the container is 501 to 2,200 pounds without the weight of the parachute. The height will vary, but will not exceed 83 inches with parachute unless specific rigging procedure authorizes it. Part Four of this manual covers rigging the A-22 container.

d. Stretch A-22 Cargo Bag. The stretch A-22 cargo bag consists of two A-22 cargo bag assemblies. The covers may or may not be used. Only six of the suspension webs are used. Nylon and cotton sling assemblies must not be mixed. The weight capacity of the load is 900 to 2,200 pounds without the weight of the parachute. Part Four of this manual covers rigging the stretch A-22 container.

e. Double A-22 Cargo Bag. The double A-22 cargo bag consists of two A-22 cargo bag assemblies. The covers may or may not be used. Only six of the suspension webs are used. Nylon and cotton sling assemblies must not be mixed. The weight capacity of the load is 900 to 2,200 pounds without the weight of the parachute. Part Four of this manual covers rigging the double A-22 container.

f. A-23 Cargo Bag. The A-23 sling assembly is similar to the A-22 sling assembly, but it has additional support webs on all four sides with an additional D-ring on each side. The weight capacity of the load is 501 to 2,200 pounds without the weight of the parachute. The A-23 container assembly is used for HAARS drops, but may be used for A-22 drops. Part Five of this manual covers rigging the A-23 container.

1-2. Types of Airdrop

The three types of airdrop by which container loads can be delivered are low-velocity airdrop, high-velocity airdrop, and free drop. These are described below.

a. Low-Velocity Airdrop. Low-velocity airdrop is the delivery of supplies and equipment from an aircraft in flight using cargo parachutes. The items are usually rigged with honeycomb under them. The cargo parachutes are attached to the top of the load. The parachutes slow the descent of the load and ensure minimum shock when the load hits the ground.

b. High-Velocity Airdrop. High-velocity airdrop is the delivery of supplies and equipment from an aircraft in flight using a stabilizing parachute. The items are rigged with honeycomb under them. The stabilizing parachute is attached to the top of the load to maintain it in an upright position.

c. Free Drop. Free drop is the delivery of certain nonfragile items of supply from an aircraft in flight without the use of the parachutes or other retarding devices. No specific instructions are given in this manual for this type of airdrop.

1-3. Commonly Used Items

Items commonly used for rigging container loads are described below. An equipment required table is included for each load in this manual as a part of the section describing that load. This table lists the items and quantity of each item needed to prepare and rig the load covered in that section. Standard airdrop hardware, straps, and canvas items are described in FM 10-500-2/TO 13C7-1-5. Canvas, metal, webbing, and wood items are inspected according to TM 10-1670-298-20&P. Strength ratings for the items in this section and for other airdrop items are listed in FM 10-516/TO 13C7-1-13. Some textile, wood, and miscellaneous items are described below. The proper use of these items will be covered in this manual or in other manuals of the FM 10-500/TO 13C7 series.

a. Textile Items. Textile items which may be used when a container load is being rigged are described below.

NOTE: Lengths will vary. Lengths specified are only typical and may be changed.

(1) Type III nylon cord is used to make safety ties and to hold items in place. It has a tensile strength of 550 pounds.

(2) One-half-inch (or 5/8-inch) tubular nylon webbing is used as a primary skid board tie. It is also used to secure items during a drop. It has a tensile strength of 1,000 pounds.

NOTE: When the 1/2-inch (or 5/8-inch) tubular nylon webbing is not available for the skid board tie, type IV (coreless) braided nylon cord can be used. When the type IV (coreless) braided nylon cord is not available, double length of type III nylon cord can be used.

(3) Type I, 1/4-inch cotton webbing is used to make many of the needed safety ties. It has a tensile strength of 80 pounds.

(4) Ticket number 8/4 and 8/7 cotton thread are used to make various ties.

b. Wood Items. Wood items used on container loads, with the exception of the A-22 skid, are made locally using details found in the rigging manual for the particular load. The 48- by 48-inch skid for the A-22 cargo bag may be ordered precut or prepared locally. When the skid is prepared locally, AC grade plywood must be used.

c. Miscellaneous Items. Miscellaneous items which may be used when a container load is being rigged are described below.

(1) Two-inch masking tape is used to secure the folds of excess webbing, to prevent honeycomb from being cut by type III nylon cord, and to hold padding in place.

(2) Cellulose wadding and felt sheets may be used to pad fragile items, to prevent sharp edges from cutting, and to protect slings during deployment.

(3) Honeycomb is used to spread the landing shock. Honeycomb is also used to fill empty spaces and to level and pad the load. The number of layers used depends on the item being airdropped and the method of airdrop. Honeycomb is issued in 3- by 36- by 96-inch sheets.

(4) Steel strapping may be used for rigging airdrop items. The standard strapping used is 1/50 inch thick and 5/8 inch wide with a breaking strength of 1,000 pounds. It can be used to bind items together or form containers on A-7A and A-21 loads. When strapping is used to form containers, it will be doubled and the maximum weight of the load will not exceed 250 pounds without parachute weight. When strapping is used on A-22 or A-23 loads, it will not be bound around the skid board unless specific rigging procedures authorize it.

1-4. Parachute Requirements

The parachute requirements for low-velocity and high-velocity airdrop are as described below.

a. Low-Velocity Airdrop. The 68-inch pilot, T-10 modified cargo, and G-14 cargo parachutes are used singularly with A-7A cargo sling loads and A-21 cargo bag loads being rigged for low-velocity airdrop. Three 68-inch pilot parachutes may also be used only on A-7A cargo sling loads. The G-14 in cluster of two or three parachutes or a G-12 cargo parachute is used with A-22 cargo bag loads. The minimum required weight and the maximum allowable weight for cargo parachutes used on loads rigged for low-velocity airdrop are listed in Table 1-1.

b. High-Velocity Airdrop. A 68-inch pilot parachute is the primary parachute used for a 75- to 150-pound load without parachute weight being prepared for high-velocity airdrop. For loads over 150 pounds, the 12- or 26-foot, high-velocity cargo parachute is the primary parachute and should be used whenever possible. See Table 1-1 for weight ranges. If a 12-foot, high-velocity cargo parachute is not available, a 15-foot cargo extraction parachute packed specifically for use as a high-velocity parachute may be used. If a 26-foot, high-

velocity cargo parachute is not available, a 22-foot cargo extraction parachute packed specifically for use as a high-velocity parachute may be used. Special packing procedures for the 15- and 22-foot cargo extraction parachutes consist of attaching the static lines and replacing the extraction line with a 20-foot cargo sling (see TM 10-1670-278-23&P/TO 13C5-26-2 for 15-foot and TM 10-1670-279-23&P/TO 13C5-27-2 for 22-foot cargo extraction parachute).

1-5. Data Tag for Rigged Loads

A data tag is prepared and secured to each container load so that it can be easily seen. Entries on the tag are used by the Army and Air Force in making inspections and in finding causes for malfunctions. The entries are also used to help the loadmaster determine where to place the loads in the aircraft. Use a ballpoint pen or other waterproof marker to record the following information on the tag:

- Total rigged weight.
- Height, including parachutes.
- Width.
- Overall length.
- Type of parachute/breakaway or nonbreakaway.

Table 1-1. Parachute requirements

Parachutes	Suspended Weight (Pounds)	
	Minimum	Maximum
Low-velocity		
One 68-inch pilot	30	50
Three 68-inch pilot	51	200
One T-10 modified cargo	90	500
One G-14 cargo	200	500
* Two G-14 cargo	501	1,000
* Three G-14 cargo	1,001	1,500
* One G-12E	501	2,200
High-velocity		
** One 68-inch pilot	75	150
Three 68-inch pilot	151	500
** One 12-foot, high-velocity cargo	151	500
One 15-foot cargo extraction	151	500
** One 26-foot, high-velocity cargo	501	2,200
One 22-foot cargo extraction	501	2,200
* On an A-22 load, a G-14 cargo parachute should be used ONLY when a G-12 cargo parachute is not available.		
** Primary parachute.		
<i>Note: Loads with three G-14 cargo parachutes must be dropped one at a time.</i>		

1-6. Computation of Minimum Weight for Container Loads

a. Container loads may be dropped from the paratroop doors or the ramp. The following minimum weight requirements apply.

(1) Paratroop Door Loads. Containers dropped from the paratroop doors require a minimum weight of 11 pounds per square foot.

(2) Ramp loads. Containers dropped from the ramp require a minimum weight of 28 pounds per square foot.

b. The following information can be used to determine the minimum weight required for a container load. Measure the length, width, and height (without parachute) of each container. Multiply the two largest dimensions (in inches). Divide the answer by 144. Multiply that answer by 28 (or 11 for paratroop door loads). The answer is the minimum allowable weight. See the example in Table 1-2.

Table 1-2. Example of determining minimum allowable weight for ramp container loads

Example	
Height (without parachute)	27 inches
Length	44 inches
Width	21 inches

44 inches x 27 inches = 1,188 square inches

$1,188 \div 144 = 8.25$ square feet

$8.25 \times 28 = 231$ pounds

The minimum allowable weight for this container is 231 pounds, without parachute.

1-7. Special Considerations

Special considerations for this manual are described below.

CAUTION: Only ammunition listed in FM 10-500-53/TO 13C7-18-41/MCRP 4-3.8 may be airdropped.

a. The loads covered in this manual may include hazardous materials as defined in AFJMAN 24-204/TM 38-250. If included, the hazardous material must be packaged, marked, and labeled as required by AFJMAN 24-204/TM 38-250.

b. A copy of FM 10-500-3/TO 13C7-1-11 must be available to the joint airdrop inspectors during the before- and after-loading inspections.

1-8. Safety Precautions

CAUTION: Package, mark, and label hazardous materials according to AFJMAN 24-204/TM 38-250.

Safety precautions must be closely followed when airdrop container loads are rigged. Failure to follow the precautions could result in serious injury to the rigger or damage to the drop item or aircraft. Take the following safety precautions when rigging an item.

a. Make sure that a lifting device has a rated lifting capacity that exceeds the weight of the item to be lifted.

b. Be sure that items being lifted are secured to the lifting device.

c. Do not work under equipment that is suspended above an airdrop container unless absolutely necessary.

d. Cover all wet cell batteries in service with plastic or nonflammable material.

e. Check the fuel tanks of engines to ensure that they are drained. Check fuel cans to make sure they are POP approved. When stowing fuel containers, use cellulose wadding or other suitable material to prevent metal-to-metal contact.

1-9. Rigging Precautions

The following precautions must be taken when a container load is being rigged.

a. Assemblies. When components of assemblies are being rigged, make sure that all items needed to operate the assembly are packed in the same airdrop container whenever possible. For example, a radio and its battery should be packed in the same container.

b. Items. When items such as radio equipment are rigged, they should be individually wrapped. Padding or honeycomb should be placed under each item being prepared and inserted between items of the load to prevent contact. Cellulose wadding, felt, or other suitable material must be used to avoid metal-to-metal or metal-to-wood contact.

c. Webbing. All excess lengths of webbing must be folded and taped or tied with type I, 1/4-inch cotton webbing. This reduces the danger of containers becoming snagged as they are ejected or released from the aircraft.

d. Hazardous Materials. Hazardous materials must be packed and the rigged load labeled or marked according to AFJMAN 24-204/TM 38-250. Gasoline cans and drums must be padded and rigged to prevent metal-to-metal contact.

1-10. Loads Dropped in Frigid Climates

When loads are dropped in frigid climates, special procedures or precautions may need to be followed.

a. Modification to Drop Items. Some drop items may have been modified for use in frigid climates by the installation of extra equipment such as heaters. Special rigging procedures may be needed when a drop item has been modified.

b. Special Rigging Requirements. When loads are to be dropped in frigid climates, all excess webbing of suspension slings and tie-down straps must be folded and tied with type I, 1/4-inch cotton webbing.

CAUTION: Masking tape **MUST** not be used in frigid climates to secure folds or excess webbing.

1-11. Final Inspection

After the data tag has been attached, the rigged load must be given a complete and final inspection by a qualified person. A-7A and A-21 loads may be inspected by either the jumpmaster or parachute rigger. If the load is rigged for HAARS, it must be inspected by a parachute rigger. All A-22 and A-23 loads will be

inspected by a parachute rigger. The inspection must include the following:

- Check for serviceability of webbing, straps, and covers.
- Make sure the load is rigged according to procedures.
- Make sure the loads containing hazardous materials comply with AFJMAN 24-204/TM 38-250 and are labeled accordingly.
- Make sure the proper size parachute has been used, and check its condition.
- Inspect the log record book.
- Make sure that the parachute is correctly connected to the load.

1-12. Release Gate

A release gate is installed in the aircraft to restrain the load during flight. It is also used to prevent premature exit of container loads from the aircraft. The gate is installed according to procedures in the technical order for the particular aircraft used. The components of the type XXVI nylon webbing release gate, with the exception of the webbing to be severed, are furnished by the US Air Force. The type XXVI nylon webbing is furnished by the user.

See Table 1-3 for release gate requirements.

Table 1-3. Release gate requirements

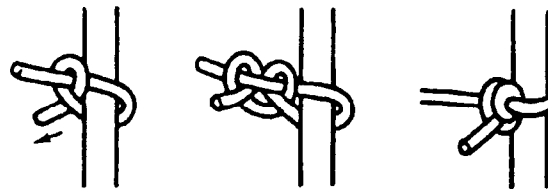
		Rigged Weight (Pounds)	Lengths of Type XXVI Nylon Webbing Required
C-130 and C-141 aircraft	Non-CVRS	501 - 13,000	One 20-foot
		13,001 - 25,000	Two 20-foot
		25,001 - 40,000	Three 20-foot
C-130 and C-141 aircraft	CVRS	501 - 13,000	One 15-foot per stick
		13,001 - 25,000	Two 15-foot per stick
C-17 aircraft	Inboard Logistics Rail	501 - 18,800	20-foot single stick
		18,801 - 37,600	40-foot double stick
Note: For multiple deliveries, provide a release gate based on the weight of each group of containers to be airdropped at one time.			

1-13. Knots Used

Some of the knots used for rigging container loads are shown in Figure 1-1.

Note: These drawings are not drawn to scale.

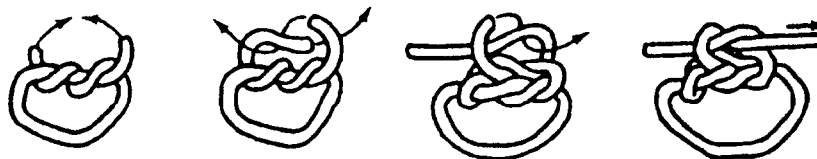
DOUBLE HALF-HITCH



OVERHAND KNOT



SURGEON'S KNOT AND LOCKING KNOT



TRUCKER'S HITCH

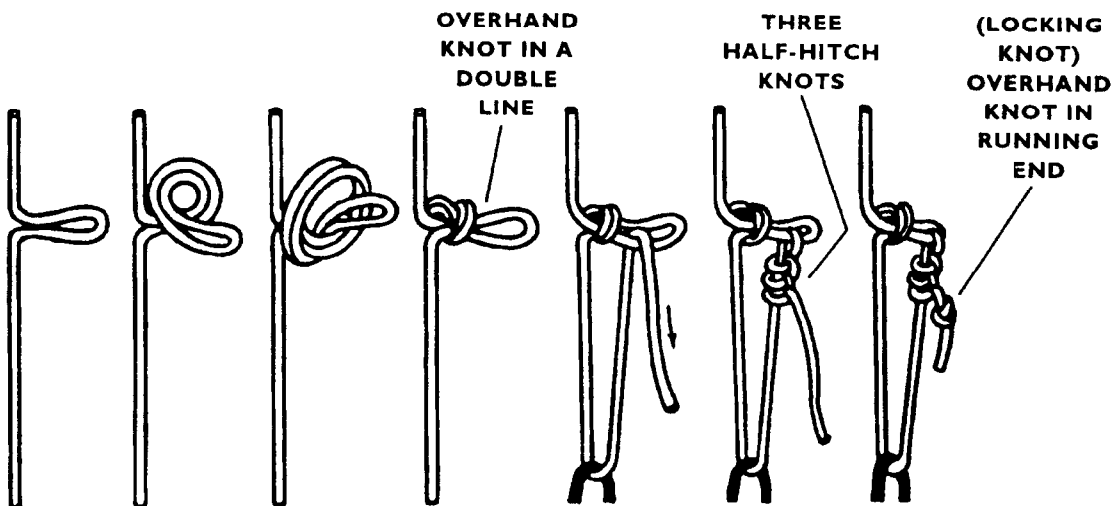


Figure 1-1. Knots used

1-14. Securing of Straps and Webbing

CAUTION: Instructions given in this paragraph must be followed exactly to ensure a malfunction-free drop.

The straps and webbing used to rig loads must be properly fastened and secured.

a. Fastening Straps With Friction Adapters. All the containers in this manual have friction adapters attached somewhere on the container. It is critical

that the running ends of straps are routed properly. Figure 1-2 identifies the parts of the friction adapter. Figure 1-3 shows how to route the running end of a strap through the friction adapter.

b. Securing Excess Strap. Excess strap is folded and tied with type I, 1/4-inch cotton webbing or 2-inch masking tape. Masking tape cannot be used for drops in frigid climates. Figure 1-3 shows how to secure excess straps.

Note: This drawing is not drawn to scale.

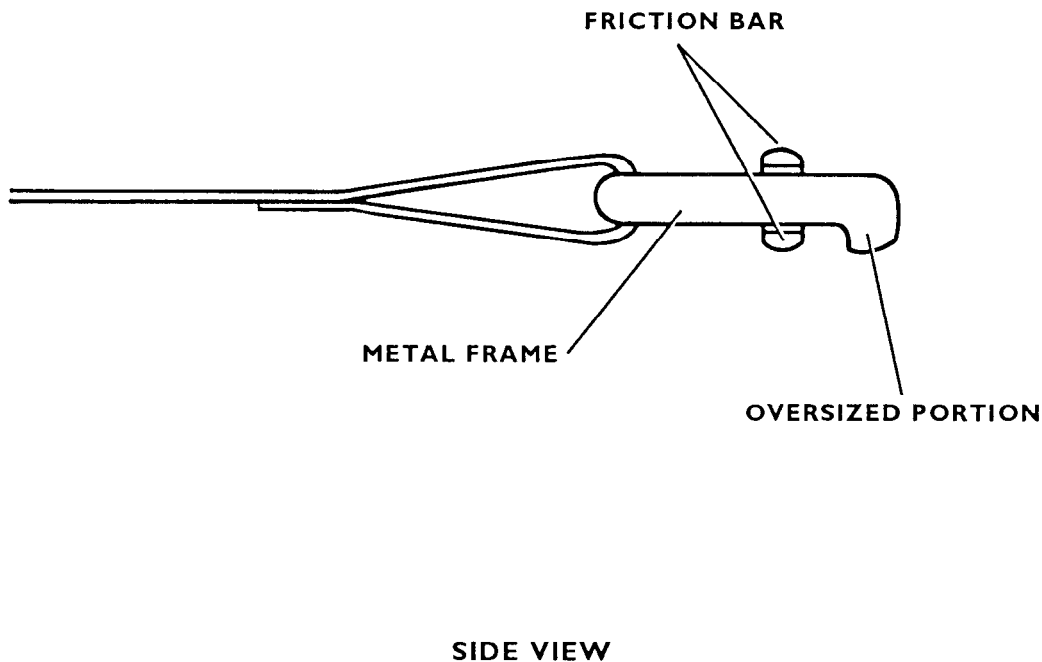
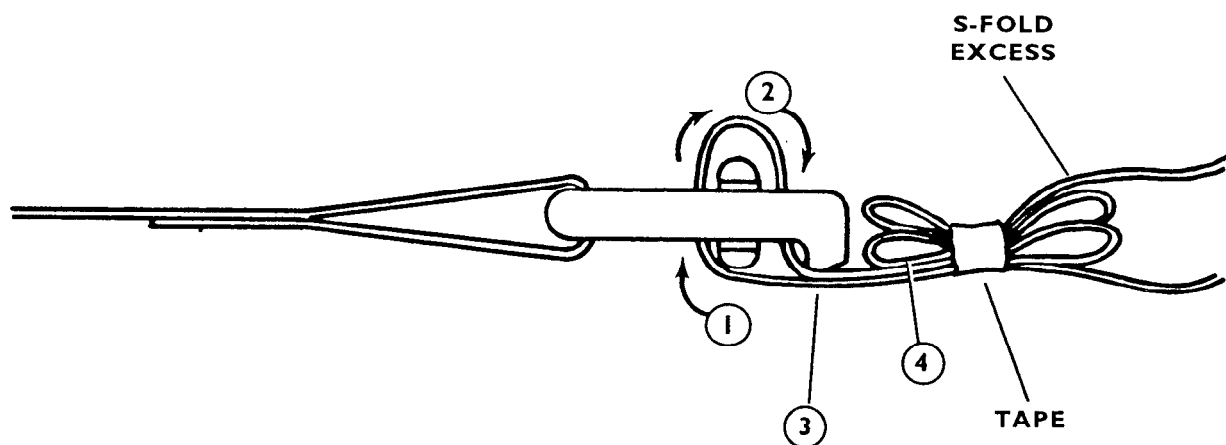


Figure 1-2. Friction adapter

Note: This drawing is not drawn to scale.



- ① Using the running end of the strap, route it up from the bottom between the friction bar and the stitch formation side of the metal frame.
- ② Bring the running end down between the friction bar and the oversized portion of the metal frame.
- ③ Pull tension. The oversized portion of the metal frame should be pressing against the two layers of strap.
- ④ Fold the excess. Secure it with either one turn single of type I, 1/4-inch cotton webbing using a surgeon's knot and locking knot or two turns of 2-inch masking tape.

Figure 1-3. Strap routed and excess secured

Section II

HIGH-ALTITUDE AIRDROP RESUPPLY SYSTEM

1-15. Description of HAARS

The HAARS is designed to resupply from aircraft flying up to 25,000 feet. It uses both high-velocity and low-velocity airdrop. At release from aircraft, the load accelerates to terminal velocity--250 feet per second. HAARS uses a 30-inch or a modified 68-inch pilot parachute to remain upright until the right altitude is reached and the altitude sensor parachute staging unit activates, which begins cargo parachute deployment. The load lands at a rate under or up to 28 feet per second. There are two rigged weight ranges.

a. The 500-pound system uses either A-7A or A-21 containers. It can weigh 200 to 500 pounds without parachutes. This load can exit the aircraft either from the paratroop door or ramp. TM 10-1670-267-12&P/TO 13C7-1-101 covers the maintenance of this system.

b. The 2,200-pound system uses an A-23 container. It can weigh 501 to 2,200 pounds without parachute. This load is CVRS compatible. TM 10-1670-265-12&P/TO 13C7-1-21 covers the maintenance of this system.

1-16. Altitude Sensor Parachute Staging Unit

The unit is covered by TM 10-1670-266-13&P. The maintenance and servicing are conducted before rigging. The sensor is set 1,900 feet above drop zone elevation. The 1,900 feet will allow 800 feet for parachute deployment, 600 feet for sensor location error, and 500 feet as a safety factor. Use TM 10-1670-266-13&P for complete setting instructions.